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Short Communication

Factors affecting wiregrass (*Aristida stricta* Michx.) cover on uncut and site prepared sandhills areas in Central Florida

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ABSTRACT

Because wiregrass (*Aristida stricta* Michx.) is a critical component of the longleaf pine (*Pinus palustris* Mill.) community of the southeastern Coastal Plain, USA, providing the fuel for recurring surface fires, we need restoration techniques which favor or at least maintain it. The study objective was to investigate what factors influence wiregrass cover in mature longleaf stands and in areas recently site prepared for re-establishment of longleaf pine. All sandhills sites which had been given hexazinone during site preparation for reforestation to longleaf pine in the past 5 years in the Ocala National Forest, Florida, USA, were sampled during the late summer and autumn of 1990. Regression analyses showed wiregrass cover was greater on areas treated to reduce oak cover with the herbicide hexazinone when dry conditions prevailed the month following application. Moisture had the reverse effect on sites chopped to reduce scrub oaks, with wiregrass cover decreasing with drier conditions. Thus, to reduce wiregrass mortality hexazinone should be applied during dry periods while conversely chopping should be done when soil moisture is high.

INTRODUCTION

Wiregrass, or pineland threeawn (*Aristida stricta* Michx.), is a major understory species in the slash pine (*Pinus elliottii* Engelm.), South Florida slash pine (*P. elliottii* var. *densa* Little and Dorman), longleaf pine (*P.*

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competing sand pine and oaks with prescribed burning. To be successful in a reasonable period, restoration will require some form of site preparation other than, or in addition to, fire. "Double chopping" refers to two treatments with a chopper, consisting of two large rotating drums pulled in series. The face of the drums contains cutting knives attached at an angle. The offset angle of the drums relative to the direction of travel causes these knives to slice and churn the soil. This treatment is unacceptable because it can nearly eliminate the wiregrass component (Grelen, 1962; Outcalt and Lewis, 1990) from these dry sandhills sites. Other less severe practices have had varied effects on wiregrass cover, ranging from apparent increases to sizeable declines. The major objective of this study was to investigate causes of the variable wiregrass responses to site preparation methods recently employed in the Ocala National Forest. The secondary objective was to investigate what factors influence wiregrass cover in mature longleaf stands.

METHODS

The study was conducted in the Ocala National Forest, located in the central highlands region of Florida, USA. Most of the forest is covered by deep sandy soils from relic dunes formed during the Pleistocene as sea level rose and fell. Sand pine scrub, a mixture of sand pine and shruby hardwoods with sclerophyllus leaves, is the most prevalent community type in the forest. Within this matrix of sand pine scrub exist islands of longleaf pine growing in open stands with scattered clumps of understory oaks and a ground cover dominated by wiregrass. At present, soils under wiregrass–longleaf differ only slightly from those of the sand pine scrub, having a dark surface horizon due to an accumulation of charcoal (Kalisz and Stone, 1984). This is the result of frequent (every 3 to 5 years) surface fires.

All sandhills wiregrass–longleaf areas ($n = 47$) receiving hexazinone during site preparation between 1985 and 1990 were sampled. Wiregrass cover was assessed during the late summer and autumn of 1990 along 30-m line transects by the line-intercept method (Mueller-Dombois and Ellenberg, 1974). Twelve transects were established from random starting points in each area. The number of 15-cm segments containing wiregrass was counted and recorded for each transect. An ocular estimate of the level of sand pine stocking was made for each site. All areas were also surveyed for evidence of past mechanical disturbance and recent fire history. Ocala National Forest records were searched to determine date of harvest, date and method of site preparation, date of last prescribed burn, and method of planting. Wiregrass cover data were also collected from 31 unharvested positive effect with greater average wiregrass cover on sites which had a higher CSI. The amount of sand pine on the site was also significant in the regression analysis (additional $R^2 = 0.08$), with wiregrass cover decreasing as sand pine cover increased. The combined regression equation was: percent wiregrass cover = 15.97 + 0.108 (CSI month after treatment) − 5.21 (level of sand pine), $R^2 = 0.44$. Wiregrass cover on areas which had received the herbicide and single chop treatment was significantly related to the CSI of the summer following the chopping treatment [percent wiregrass = 46.93 − 0.095 (average CSI from June to August), $R^2 = 0.30$, $n = 22$]. For this treatment, wiregrass cover decreased as the CSI for summer increased.

Without fire, wiregrass production gradually diminishes over time (Clewell, 1989). Conversely, an increase in growth and flowering normally occurs following burning of wiregrass (Lemon, 1967; Vogl, 1973). Therefore, the length of time since the last fire might be expected to correlate with wiregrass cover. However, all of the wiregrass–longleaf stands with longleaf beyond the sapling stage in the Ocala National Forest have been on a 3- to 4-year burning cycle since 1985. Thus, not enough time had elapsed since the last fire for wiregrass production to decline in the uncut stands. The lack of response of wiregrass to normal tree density (250–720 trees/ha) found in the forest agrees with previous work by Clewell (1989), who found no relationship between overstory cover and wiregrass density.

Cumulative severity index following site preparation treatments was significant in the regressions for wiregrass cover on both herbicide and herbicide and chopped sites. In herbicide only areas, wetter conditions the month following herbicide application were related to lower wiregrass cover. This is likely due to an increase in spread and activation of the chemical with higher levels of soil moisture. Hexazinone is absorbed passively into the transpiration stream from the soil solution. Thus, increased moisture increases spread and uptake. Hexazinone needs to be applied during the active growing season to be effective against woody competition, but making applications during months of lower expected rainfall should reduce the possibility of wiregrass damage.

The lower wiregrass cover with increasing sand pine noted in herbicide only areas is likely caused by a reduction in wiregrass from sand pine competition. Most areas currently being restored with hexazinone are prescribed burned during site preparation operations. Removal of sand pine by hand felling prior to the burning should increase wiregrass cover and vigor.

In areas which were chopped after herbicide application, summer CSI was significantly related to wiregrass cover. Mechanical treatments kill wiregrass by exposing and drying the roots. Increased soil moisture would

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